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Myocarditis in Jamaica

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During the nineteenth century myocarditis was a common clinical diagnosis. When necropsies were performed more frequently, confirmation of myocarditis was not often obtained and the diagnosis fell into disrepute. Interest in the condition was reawakened as a result of the work of Saphir, chiefly carried out in the 1920s and since. He demonstrated convincingly that non-specific inflammatory change in the myocardium was an important cause of death. He estimates that, provided that adequate numbers of microscopical sections of the heart are examined, there is an incidence of 3·5 per cent among all necropsies (Saphir, 1959). This knowledge is of more than academic interest as it has helped to stimulate the investigation of unusual forms of cardiac disease, particularly the so-called cardiomyopathies.

There are numerous case reports of myocarditis, chiefly from temperate zones. Many of them deal with unusual myocardial inflammations, termed idiopathic, Fiedler's, atypical, non-specific, or giant cell myocarditis (for example, Covey, 1942; Engelhardt and Bruno, 1943; Lynch and Watt, 1957). Although numerous, the reports are isolated and do not give any indication of its over-all incidence. Relatively few large series have been reported, but one from North America described 1402 cases on which was based an ætiological classification (Gore and Saphir, 1947). It is difficult to tell from their study how frequently myocarditis occurred, because the cases were drawn from diverse sources. Another smaller study from North America about the same time showed an incidence of approximately 1 per cent in 3800 necropsies (Marcuse, 1947). Both these reports emphasized the frequency of myocardial involvement in systemic infections.

In view of the prevalence of various infections in tropical areas, myocarditis has always been of practical interest, and Table I gives a summary of some of the reports available, including a few from areas where unexplained heart disease is not known to be a significant clinical problem. These reports deal with myocarditis either of unusual type or of unusual severity. Owing to probable differences in diagnostic criteria, the prevalence at the various centres is not strictly comparable. As these reports did not attempt to assess the incidence of myocarditis, it is not possible to gain a reliable idea of the over-all importance of myocarditis in the tropics.

Heart disease of unexplained nature is of great practical importance in tropical countries. Endomyocardial fibrosis in Uganda (Davies, 1961), nutritional heart disease, cardiovascular collagenosis, and cryptogenic heart disease in South Africa (Gillanders, 1951; Becker, Chatgidakis, and van Lingen, 1953; Higginson, Isaacson, and Simson, 1960), idiopathic cardiac enlargement in Jamaica (Stuart and Hayes, 1963), and heart muscle disease in Nigeria (Edington and Jackson, 1963), are some examples of the unexplained heart diseases affecting specifically people of African origin. Most of these conditions show some degree of myocardial fibrosis, and it is possible that some of these scars might result from antecedent myocarditis.

In view of the lack of information on myocarditis occurring in tropical areas and of its possible relation to unexplained heart disease, it was decided to determine the incidence and type of myocarditis occurring in Jamaica. This paper is a summary of the findings.

Subjects and Methods

A retrospective study was undertaken of all necropsies performed on patients dying at the University College Hospital of the West Indies between September 1952 and July 1962. All cases diagnosed as having myocarditis or with histological abnormality of the myocardium were re-examined. The diagnosis of myocarditis was accepted if the abnormalities fulfilled one of the following criteria.

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TABLE I

SUMMARIZED REPORTS OF MYOCARDITIS

Country	Year	No. of cases	Total necropsies	Per cent of necropsies with myocarditis	Reference
Nigeria	1921–53	14	3645	0·4	Edington (1954)
Uganda (a)	1952–57	9	3548	0·3	Davies and Coles (1959)
(b)	1950–58	20	4000	0·5	Davies (1961)
South Africa		16	2367	0·6	Higginson *et al.* (1960)
Columbia	1954–61	5	930	0·5	Correa *et al.* (1963)
Philippines		43	6000	0·7	Imperial and Felarca (1963)

(a) Severe interstitial infiltration by inflammatory cells.

(b) Muscle fibre necrosis associated with inflammatory infiltrate.

(c) Abscess formation or granulomatous change in the myocardium.

A note was made of the type of infiltration, site of myocardial involvement, extent and severity of the lesions, muscle fibre changes, and association with a generalized morbid process.

Results

In the period under examination 3040 necropsies had been performed. The hospital serves chiefly the poorer section of the population and draws its patients from Kingston and the surrounding countryside. The age, sex, and racial distribution is similar to the figures already reported from this department (Bras, Brooks, and Watler, 1961). Fig. 1 gives the age, sex, and heart weights of the adults considered in this paper.

Abnormalities of the type given above were found in 102 hearts, which represents a prevalence of 3·4 per cent in 3000 necropsies (in 40 instances no myocardium was available for examination). Table II shows the cases in ætiological groups. Representative histological changes are illustrated in Fig. 1–7.

Rheumatic carditis was only diagnosed on the finding of Aschoff bodies in the myocardium. Rheumatic fever is common among Jamaican children (Back and DePass, 1964) and rheumatic valvular scarring is frequently seen in hearts of adults at necropsy. The frequency of rheumatic carditis in this series is, therefore, in keeping with the local clinical experience. No complicating factor such as endomyocardial fibrosis has been seen in this group of cases as reported in the series from Nigeria (Abrahams and Brigden, 1961).

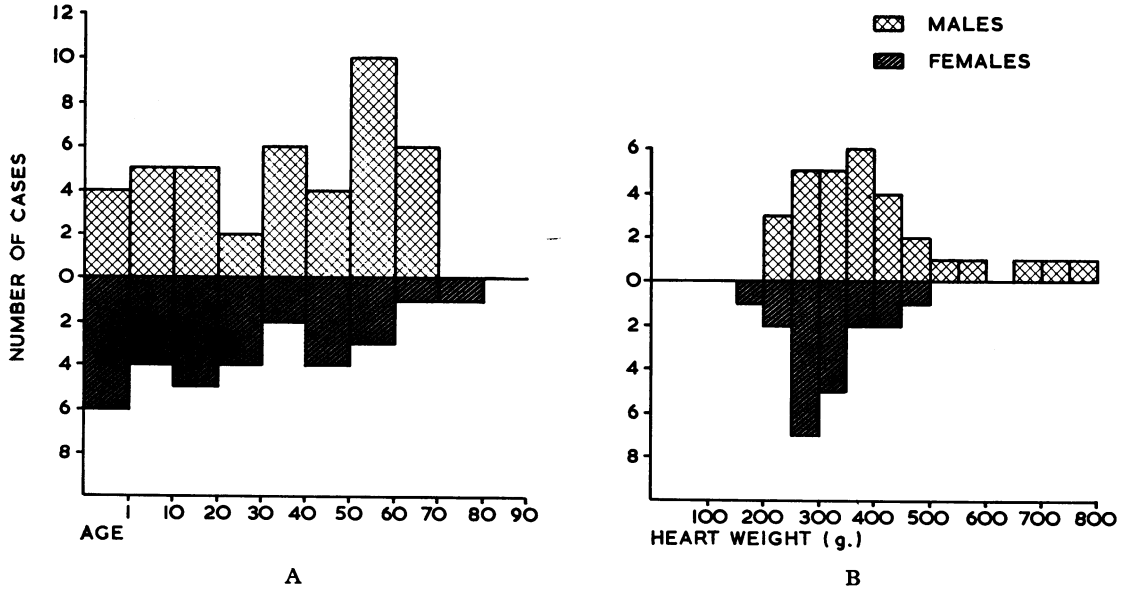

FIG. 1.—(A) Age and sex distribution of myocarditis in Jamaica.
(B) Heart weights (g.) of patients over 17 years of age, excluding those with rheumatic myocarditis.

TABLE II

FORMS OF MYOCARDITIS IN JAMAICA

Disease		No. of cases	Per cent of all cases with myocarditis
Rheumatic heart disease		30	29
Septicæmia, all forms		34	33
Protozoal:			
Toxoplasma	2		
Associated with malaria	3	5	5
Reticulosis/leukæmia		6	6
Granulomatous—Tuberculosis	2		
Sarcoidosis	2		
Syphilis	2	6	6
Carcinoma, all types		4	4
Uræmia		4	4
"Idiopathic"		13	12
		102	

TABLE III

SEPTICÆMIA: CAUSATIVE ORGANISMS AND SITE OF INFECTION

Organism and disease	No.
Causative Organisms	
Leptospirosis	8
Staphylococcus	6
Gram-negative bacilli	4
Streptococcus	2
Clostridium tetani	2
Not cultured, bacterial	12
Total	34
Disease	
Pneumonia	7
Subacute bacterial endocarditis	5
Gastro-enteritis	3
Peritonitis	2
Pyelonephritis	1
Meningitis	1
No focus found	15
Total	34

It may seem strange to those not well acquainted with Jamaica that though it is a tropical island it has little infectious tropical disease. This series shows that non-tropical septicæmic conditions formed the largest group after rheumatic myocarditis. The organisms isolated and their probable site of entry or type of clinical infection are shown in Table III. Malaria was endemic in Jamaica in the early days of this hospital when malaria eradication schemes had not been successfully completed. No patients with malaria, from Jamaica or elsewhere, have been seen at this hospital until recently when one case was diagnosed hæmatologically. The three cases coming to necropsy listed as malarial may simply be myocarditis incidently associated with a malarial infection, though at least one case has large numbers of malarial parasites in the blood vessels.

The small number of cases showing heart involvement in leukæmia and in lymphomata of various

FIG. 2.—Focal myocarditis in leptospirosis. Muscle fibre disruption with phagocytosis by macrophages and polymorphs. (H. and E. ×850.)

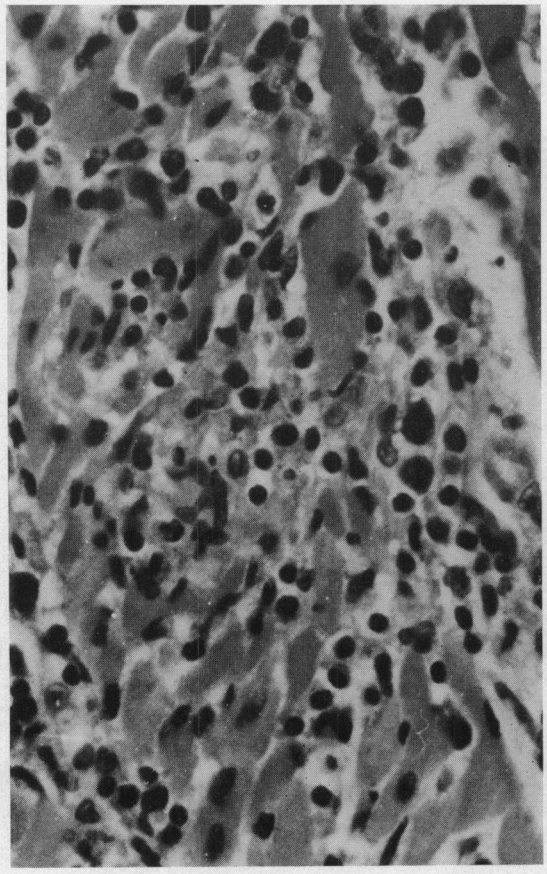

FIG. 3.—Idiopathic myocarditis (Case 4). A focus of macrophages, lymphocytes, and plasma cells. Early muscle fibre necrosis. (H. and E. × 600.)

FIG. 4.—Idiopathic myocarditis (Case 7). Severe, diffuse interstitial infiltrate by lymphocytes, plasma cells, and occasional large macrophages. There is prominent interstitial œdema. (H. and E. × 600.)

types is rather surprising in view of the relatively large number of cases examined with these conditions—85 necropsies up to 1964. No obvious reason for this can be offered.

The anatomical features specifically assessed—site, severity, and type of infiltrate—were of inconstant occurrence except in leukæmia where the vascular changes were virtually diagnostic. In very few cases was there no muscle fibre necrosis but this was chiefly a result of the criteria of selection. Only staphylococcal infections were associated with frank abscess formation. In none of the cases with septicæmia was mural thrombosis noted.

The majority of the hearts of adults over the age of 17 were increased in weight. It should be emphasized that the normal Jamaican heart is slightly smaller than that of Europeans and North Americans of Caucasian extraction (Fig. 1B). Part of the weight increase is presumably due to œdema and inflammatory infiltrate.

The 13 cases of idiopathic myocarditis represent approximately 0·3 per cent of all the patients coming to necropsy, and this is close to the figures given in Table I. A summary of the essential features of the idiopathic cases is given in Table IV, and typical histological features are shown in Fig. 3–5.

DISCUSSION

The prevalence of myocarditis in this study is similar to the figure given by Saphir (1959). The over-all pattern of the condition resembles that described in temperate zones, a preponderance of the cases being associated with septicæmia. It is important to notice that there are few examples of myocarditis occurring with tropical forms of

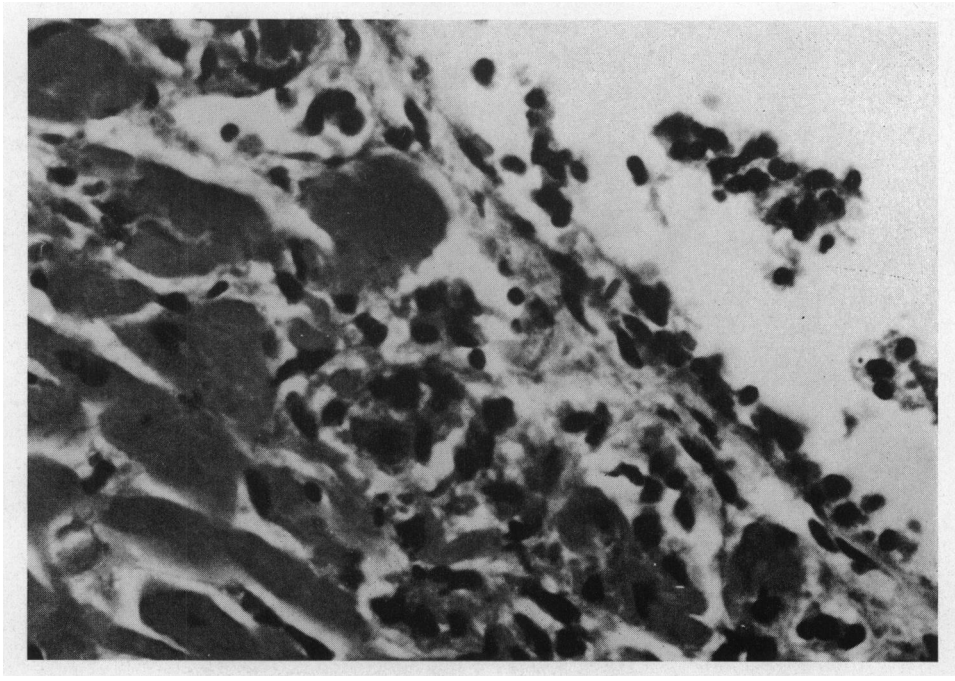

FIG. 5.—Idiopathic myocarditis (Case 12). Subendocardial focus of necrosis with polymorph and lymphocyte reaction. There is mural adhesion of polymorphs. (H. and E. ×600.)

TABLE IV

IDIOPATHIC MYOCARDITIS: SUMMARY OF FEATURES

Case No.	Age (yr.)	Sex	Clinical features	Heart weight(s)(g.)	Gross changes	Microscopical myocardial changes
Children						
1	6	F	Heart enlargement for 5 mth.	314 (94)	Yellow blotches	Diffuse destructive granuloma; many plasma cells, macrophages, lymphocytes, and polymorphs
2	13	F	Sudden collapse	Not weighed	Pericarditis	Diffuse interstitial; many polymorphs, round cells, necrosis
3	11	M	Ill for 3 days	218 (122)	Not recorded	Diffuse; severe interstitial round cell infiltrate
4	2½	F	Foreign body in trachea; cardiac arrest; massage	80 (59)	Not recorded	Focal aggregations of polymorphs; frequent necrosis
5	8/12	F	Congestive heart failure	58 (45)	Not recorded	Diffuse; interstitial round cell infiltrate, nearly granuloma
6	1¼	F	Sudden death	66 (55)	Not recorded	Diffuse, round cells, eosinophils, few polymorphs, necrosis present
7	6/12	M	Brought in dead	56 (31)	Not recorded	Diffuse, severe round cell infiltrate
Adults						
8	42	M	Heart failure 5 mth.; terminal embolus	580	Thrombus on valves	Inner third severe round cell infiltrate; necrosis very frequent
9	62	M	20 yr. rheumatoid arthritis; aortic valve disease, heart failure	446	Calcified aortic valve	Outer third monocytic cells, focal necrosis; foci of lymphocytes in epicardium
10	54	F	Scleroderma	174	No evidence scleroderma heart	Focal necrosis; round cell infiltrate; eosinophils numerous
11	23	F	Pregnant; primary pulmonary hypertension; sudden death	272	Right ventricle enlarged	Focal necrosis; chiefly polymorphs
12	20	F	Ectopic pregnancy; collapse 2 days post-operation	316	Not recorded	Focal subendocardial necrosis; round cells
13	32	F	Jaundice in pregnancy	286	Not recorded	Diffuse; interstitial round cell; focal necrosis

The weights in brackets are the average weights for the age given by Copoletta, J. M., and Wolbach, S. B. (1933). *Amer. J. Path.*, 9, 55.

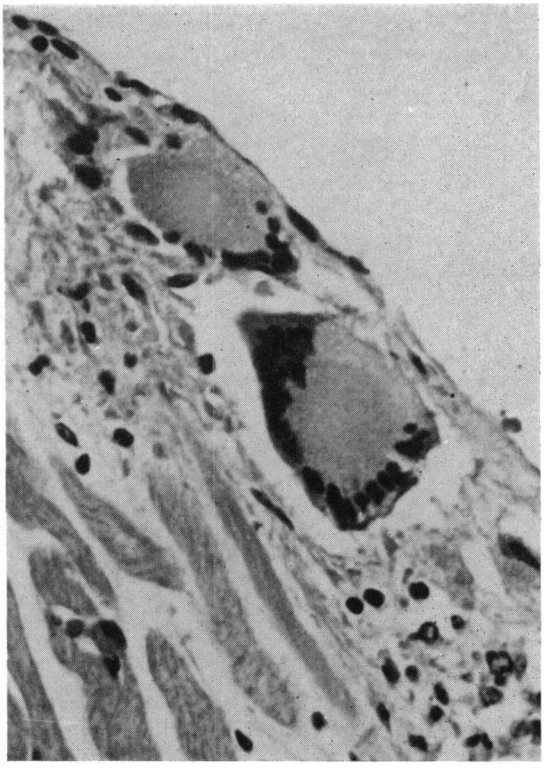

FIG. 6.—Subendocardial giant cell granuloma in sarcoidosis. (H. and E. ×600.)

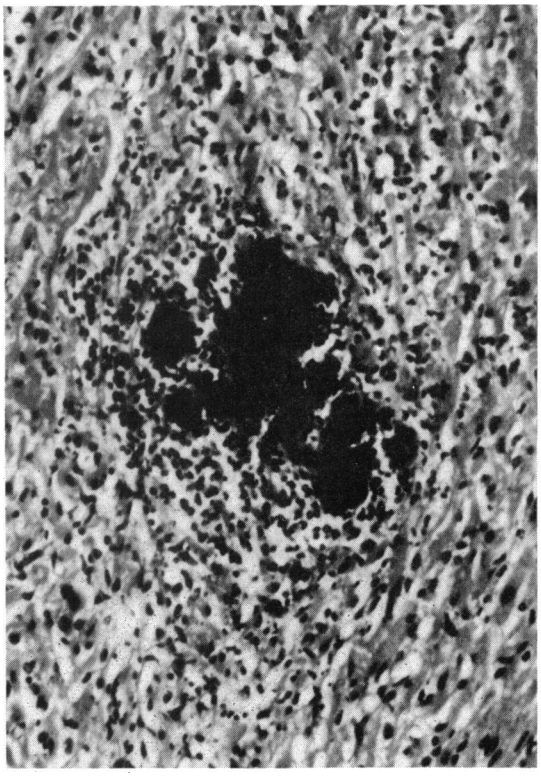

FIG. 7.—Pyæmic abscess in staphylococcal septicæmia. Central clumps of bacteria surrounded by polymorphs. (H. and E. ×600.)

disease, though such might be expected in a tropical island. This feature has recently been commented on with reference to typhoid and paratyphoid fevers in Jamaica (Ashcroft, 1964). Neighbouring islands have such tropical diseases as schistosomiasis, coccidioidomyocosis, Chagas' disease (trypanosomiasis), trichinosis, malaria, and toxic bites from reptiles and scorpions, but none of these conditions occurs in Jamaica. Since collection of the material for this report, one case of hyperinfestation by *Strongyloides stercoralis* with myocardial involvement has been reported from this laboratory (Bras *et al.*, 1964). There has also been one confirmed case of malaria, as already mentioned.

There is a surprising frequency of myocarditis due to leptospirosis. About one-third of the necropsies on cases of leptospirosis showed myocarditis, one already having been reported (Bras, 1955). Similar findings have been reported in Puerto Rico (Areán, 1957) where *L. icterohæmorrhagica* and *L. Bataviæ* were the common pathogens. In Jamaica *L. icterohæmorrhagica* and *L. kremastos* are usual (Grant, Chen, and Urquhart, 1964).

About one-tenth of the cases are of unexplained origin. Virus infection is a well-recognized cause of myocarditis but no virological studies were made on the patients grouped under this particular heading. It is not possible to say whether these cases might have been due to virus infection. One case of fatal disseminated varicella did not show myocarditis (Hayes *et al.*, 1965). No myocarditis was seen in a patient with virologically confirmed herpes simplex who died and was examined at necropsy. More than half of the cases of idiopathic myocarditis occurred in children, and in most the illness was of brief duration. This might be explained by a viral infection, but there is no direct evidence to support this suggestion. Of the adults with unexplained myocarditis, three were pregnant women. Unexplained heart disease is well documented in pregnancy (Gouley, McMillan, and Bellet, 1937; Becker and Taube, 1962), but these reports give no mention of inflammatory changes in the myocardium.

This study shows that there is no constant pattern to the site and nature of involvement of the

muscle in myocarditis. Healing of the inflammatory lesion may well give rise to focal scars scattered throughout the muscle. The heart affected by such inflammatory changes does tend to be large but when the patient recovers the heart returns to normal size clinically. A transitory enlargement and patchy fibrosis therefore seem to be insufficient evidence on which to conclude that myocarditis causes idiopathic hypertrophy in Jamaica.

Summary

A review of the histology of heart muscle from 3000 necropsies in Jamaica has shown 102 cases with myocarditis (3·4%). The relevant clinical and pathological features are documented. Excluding 30 cases of rheumatism, myocarditis was most frequently associated with some form of septicæmia, whereas tropical diseases were of minor importance. An attempt to relate myocarditis with unexplained heart enlargement in Jamaica was inconclusive. The results are discussed with reference to the findings in some earlier reported series.

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